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ATTORNEY DOCKET NO. 10060298-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Stuart M. Lindsey, et al.

Serial No.: 10/725,769 | **Examiner: Tony Ko**

Filing Date: December 2, 2003 | **Group Art Unit: 2800/2878**

Title: FAST SCANNING STAGE FOR A SCANNING PROBE MICROSCOPE

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on .

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) $ **30.00.**

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)(1)-(5)) for the total number of months checked below:

☐	one month	$ 120.00
☐	two months	$ 450.00
☐	three months	$1020.00
☐	four months	$1590.00

☐ The extension fee has already been filled in this application.

☒ (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account **50-1078** the sum of $30—. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account **50-1078** pursuant to 37 CFR 1.25.

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Respectfully submitted,

Stuart M. Lindsey, et al.

By [signature]

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Date: June 29, 2009

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IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Appl. No. : 10/725,769
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Filed: December 2, 2003
TC/A.U.: 2800/2878
Examiner: Tony Ko
Atty. Docket: 10060298-02
Confirmation No.: 3836
Title: FAST SCANNING STAGE FOR A SCANNING PROBE MICROSCOPE

APPEAL BRIEF

Honorable Assistant Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In connection with the Notice of Appeal dated **April 27, 2009**, Applicants provide the following Appeal Brief in the above-captioned application.

1. Real Party in Interest

The real party in interest as assignee of the entire right and title to the invention described in the present application is Agilent Technologies, Inc., having a principle place of business at 5301 Stevens Creek Blvd Santa Clara, CA USA.

2. Related Appeals and Interferences

There are no known related appeals or interferences at the time of filing of this Appeal Brief.

3. Status of the Claims

Claims 1-13 and 15 are pending in the application. Claim 14 is cancelled. Claims 1-13 and 15 are the claims on appeal and are reproduced in the Appendix.

4. Status of the Amendments

There are no amendments pending at the present time.

5. Summary of the Claimed Subject Matter[1]

Referring to claim 1:

In accordance with a representative embodiment, a fast scanning stage (Figs. 2A and 2B) for a scanning probe microscope, which includes a probe (e.g., 24 shown in Fig. 2B), comprises a fixed support (e.g., 23 shown in Figs. 2A and 2B), and a sample stage (e.g., 21 shown in Figs. 2A and 2B) having at least one axis of translation. The sample stage (e.g., 21) is affixed to fixed (e.g., 23) support by means for causing displacement (e.g., 22 shown in Figs. 2A and 2B) of the sample stage (e.g., 21) relative to the probe (e.g., 24). The means for causing displacement (e.g., 22) comprises actuator elements

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1 In the description to follow, citations to various reference numerals, drawings and corresponding text in the specification are provided solely to comply with Patent Office Rules. It is emphasized that these reference numerals, drawings and text are representative in nature, and in not any way limiting of the true scope of the claims. It would therefore be improper to import any meaning into any of the claims simply on the basis of illustrative language that is provided here only under obligation to satisfy Patent Office rules for maintaining an Appeal.

(e.g., 22 shown in Figs. 2A and 2B) extending between the fixed support (e.g., 23) and the sample stage (e.g., 21). The means for causing displacement is responsive to the application of a bias voltage of 100 volts or less; and the scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz. (Kindly refer to claim 1; Figs. 2A, 2B and paragraphs [0024] through [0035] of the filed application.)

Referring to claim 2:

In accordance with another representative embodiment, a fast scanning stage (Figs. 2A and 2B) for a scanning probe microscope, which includes a probe (e.g., 24 shown in Fig. 2B), comprises a fixed support (e.g., 23 shown in Figs. 2A and 2B) and a sample stage (e.g., 21 shown in Figs. 2A and 2B) having at least one axis of translation (e.g., shown in Figs. 5A and 5B). The sample stage (e.g., 21) is affixed to the fixed support (e.g., 23) by means for causing displacement (e.g., 22 shown in Figs. 2A and 2B) of the sample stage (e.g., 21) relative to the probe (e.g., 23). The means for causing displacement (e.g., 22) of the sample comprises actuator elements (e.g., 22) extending between the fixed support (e.g. 23) and the sample stage (e.g., 21) and a sine waveform generator (e.g., 20 shown in Fig. 2A) for actuating the actuator elements (e.g., 22) through the application of a bias voltage of 100 volts or less. The scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz. (Kindly refer to claim 2; Figs. 2A, 2B and paragraphs [0024] through [0035] of the filed application.)

Referring to claim 4:

In accordance with a representative embodiment, a fast scanning stage (Figs. 2A and 2B) for a scanning probe microscope, which includes a probe (e.g., 24 shown in Fig. 2B), comprises fixed support (e.g., 23 shown in Figs. 2A and 2B) and a sample stage (e.g., 21 shown in Figs. 2A and 2B) having at least one axis of translation. The sample stage (e.g., 21) is affixed to the fixed support (e.g., 23) by actuator elements (e.g., 22)

extending between the fixed support (e.g., 23) and the sample stage (e.g., 21). A sine waveform generator (e.g., 20 shown in Fig. 2A) actuates the actuator elements. The sample stage (e.g., 21) is displaced by the actuator elements (e.g., 22) being driven at the frequency of resonant vibration through the application of a bias voltage of 100 volts or less corresponding to translation of the sample stage with respect to the probe. The scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz. (Kindly refer to claim 4; Figs. 2A, 2B and paragraphs [0024] through [0035] of the filed application.)

Referring to claim 12:

In accordance with another representative embodiment, a scanning probe microscope includes a probe (e.g., 24 shown in Fig. 2B) and a fast scanning stage (e.g. Fig. 2A and 2B). The fast scanning stage comprises a fixed support (e.g., 23 shown in Figs. 2A and 2B), and a sample stage (e.g., 21 shown in Figs. 2A and 2B) having at least one axis of translation. The sample stage (e.g., 21) is affixed to the fixed support (e.g., 23) by actuator elements (e.g., 22) extending between the fixed support (e.g., 23) and the sample stage (e.g., 21) and supporting the sample stage (e.g., 21) to cause displacement of the sample stage relative to the probe through the application of a bias voltage of 100 volts or less. The scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz. (Kindly refer to claim 12; Figs. 2A, 2B and paragraphs [0024] through [0035] of the filed application.)

Referring to claim 13:

A method of operating a fast scanning stage for a scanning probe microscope, which includes a probe (e.g., 24 shown in Fig. 2B), comprises providing a sample stage (e.g., 21 shown in Figs. 2A and 2B). The method comprises having a sample on the sample stage (e.g., 21) and causing displacement of the sample on the sample stage (e.g., 21) relative to the probe (e.g., 24) by actuating actuator elements (e.g., 22 shown in Figs.

2A and 2B) extending between the sample stage and a fixed support (e.g., 23 shown in Figs. 2A and 2B). The actuator elements (e.g., 22) drive the sample stage (e.g., 21) at the resonant frequency of the sample stage using a sine waveform generator (e.g., 20 shown in Fig. 2A) through the application of a bias voltage of 100 volts or less, wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz. (Kindly refer to claim 14; Figs. 2A, 2B and paragraphs [0024] through [0035] of the filed application.)

6. Grounds of Rejection to be Reviewed on Appeal

The grounds of rejection to be reviewed on appeal are whether:

I. Claims 1, 2, 4, 12 and 13 are properly rejected under 35 U.S.C. § 103(a) in view of *Funakubo, et al.* (Translation of JP 62105440) in view of *Watanabe, et al.* (U.S. Patent 5,371,365);

II. Claims 3,5 and 6 are properly rejected under 35 U.S.C. § 103(a) in view of *Funakubo, et al.* in view of *Watanabe, et al.* and *Sarkar, et al.* (US Patent 6,806,991);

III. Claim 7 is properly rejected under 35 U.S.C. § 103(a) in view of *Funakubo, et al.* in view of *Watanabe, et al., Sarkar, et al.* and *Pai, et al.* (US Patent 6,338,249);

IV. Claim 8 is properly rejected under 35 U.S.C. § 103(a) in view of *Funakubo, et al.* in view of *Watanabe, et al., Sarkar, et al.* and *Elings* (US RE 37,560);

V. Claims 9 and 10 are properly rejected under 35 U.S.C. § 103(a) in view of *Funakubo, et al.* in view of *Watanabe, et al., Sarkar, et al.* and *Zdbelick* (US Patent 4.906,840);

VI. Claim 11 is properly rejected under 35 U.S.C. § 103(a) in view of *Funakubo, et al.* in view of *Watanabe, et al.* and *Marchman* (US Patent 5,811,796); and

VII. Claim 15 is properly rejected under 35 U.S.C. § 103(a) in view of *Funakubo, et al.* in view of *Watanabe, et al., Sarkar, et al.* and *Ando, et al.* ("A High-Speed Atomic Force Microscope for Studying Biological Samples.")

7. Argument

I. Rejection of claims 1, 2, 4, 12 and 13

A *prima facie* case of obviousness has three requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, requires some reason that the skilled artisan would modify a reference or to combine references.[2] The Supreme Court has, however, cautioned against the use of "rigid and mandatory formulas" particularly with regards to finding reasons prompting a person of ordinary skill in the art to combine elements in the way the claimed new invention does.[3] But rather the Supreme Court suggests a broad, flexible "functional approach" to the obviousness analysis recognizing that "[i]n many fields it may be that there is little discussion of obvious techniques or combinations."[4] Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the same time the invention was made. In other words, a hindsight analysis is not allowed.[5] Lastly, the prior art reference or combination of references must teach or suggest all the limitations of the claims.[6]

a. Claim 1

Claim 1 recites:

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[2] See Princeton Biochemicals, Inc. v. Beckman Coulter, Inc., 411 F.3d 1332 (Fed. Cir. 2005) ("[S]imply identifying all of the elements in a claim in the prior art does not render a claim obvious.").

[3] See KSR Int'l Co. v. Teleflex Inc., 127 S. Ct. 1727 (2007) ("The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents.").

[4] Id. See also Id. at 1743 F. 3d 1356 (Fed. Cir. 2006) ("Our suggestion test is in actuality quite flexible and not only permits, but *requires*, consideration of common knowledge and common sense") (emphasis in original).

[5] See Amgen, Inc. v. Chugai Pharm. Co., 927 F.2d 1200 (Fed. Cir. 1991) ("Hindsight is not a justifiable basis on which to find that ultimate achievement of a long sought and difficult scientific goal was obvious.").

[6] See In re Wilson, 424 F.2d 1382 (C.C.P.A. 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art.").

A fast scanning stage for a scanning probe microscope, said scanning probe microscope including a probe, said fast scanning stage comprising, a fixed support, and a sample stage having at least one axis of translation, said ***sample stage being affixed to said fixed support by means for causing displacement of said sample stage relative to said probe, wherein said means for causing displacement comprises actuator elements extending between said fixed support and said sample stage*** *and wherein said means for causing displacement is responsive to the application of a bias voltage of 100 volts or less and wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about kHz.*

In rejecting claim 1, the Office Action directs Applicants to the base 10 of *Funakubo, et al.* for the alleged disclosure of the fixed support. The Office Action relies on the vibrating stage 37 of *Funakubo, et al.* for the alleged disclosure of the sample stage and the fastening sections 19 and 39 for the alleged disclosure of the means for causing displacement of the sample stage. Furthermore, the Office Action relies on piezoelectric actuators 18, 38 for the alleged disclosure of the actuator elements extending between the fixed support and the sample stage.

In accordance with representative embodiments described in the filed application, a sample stage 21 is affixed to a fixed support 23. Means for causing displacement comprising actuator elements 22 extending between the fixed support 23 and the sample stage 23 are shown, for example in Fig. 2B of the filed application. Thus, the actuator elements 22 are provided between the fixed support 10 and the sample stage 21.

By contrast, and assuming arguendo but not conceding that the base 10 of *Funakubo, et al.* is the fixed support, only one piezoelectric element is provided between the fastening section 19 and a plate spring 16. The second piezoelectric element 38 extends between a y-axis vibrating stage 17 and a fastening section 39; however, and as most readily seen in Fig. 1 of *Funakubo, et al.* the fastening section is not affixed to the base 10. Thus, the piezoelectric elements 18, 38 of *Funakubo, et al.* do not extend between the fixed support and the same sample stage, as claimed, but rather each

respectively only extend to two separate vibrating stages 16 and 17. Stated somewhat differently, rather than the sample stage being affixed to the fixed support and a means for causing displacement that comprises actuator <u>elements</u> extending between the fixed support and the sample stage, one piezoelectric element 18 is connected to a plate spring 16, and another piezoelectric element 38 is connected to another plate spring 36.

Furthermore, and again assuming arguendo but not conceding that the vibrating stage 37 is the sample stage, Applicants respectfully submit that only piezoelectric element 38 is connected to the vibrating stage 37. As such, there is only one actuator element extending to the sample stage. Moreover, piezoelectric element 38 is not connected to the base 10, and therefore, does not extend ***between the fixed support and the sample stage*** as specifically recited in claim 1.

For at least the reasons set forth above, Applicants respectfully submit that the applied art fails to disclose at least one feature of claim 1. As such, a *prima facie* case of obviousness has not been established and claim 1 is patentable over the applied art.

<u>b. Claim 12</u>

Claim 12 recites:

A scanning probe microscope including a probe and a fast scanning stage, said fast scanning stage comprising a fixed support, and a sample stage having at least one axis of translation, said ***sample stage being affixed to said fixed support by actuator elements extending between said fixed support and said sample stage and supporting said sample stage to cause displacement of said sample stage relative to said probe*** *through the application of a bias voltage of 100 volts or less, wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz.*

Claim 12 was rejected on the same grounds as claim 1. Applicants thus respectfully submit that the rejection of claim 12 is improper for at least the same

reasons. As such, a *prima facie* case of obviousness has not been established and claim 12 is patentable over the applied art.

c. Claim 2

Claim 2 recites:

A fast scanning stage for a scanning probe microscope, said scanning probe microscope including a probe, said fast scanning stage comprising a fixed support and a sample stage having at least one axis of translation, said sample stage being affixed to said fixed support by means for causing displacement of said sample stage relative to said probe, and in which said means for causing displacement of said sample comprises actuator elements extending between said fixed support and said sample stage and a sine waveform generator for actuating said actuator elements through the application of a bias voltage of 100 volts or less, wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz.

In rejecting claim 2, the Office Action relies on the vibrating stage 37 of *Funakubo, et al.* for the alleged disclosure of the sample stage and the fastening sections 19 and 39 for the alleged disclosure of the means for causing displacement of the sample stage. Furthermore, the Office Action relies on piezoelectric actuators 18, 38 for the alleged disclosure of the actuator elements extending between the fixed support and the sample stage. Accordingly, and for at least the same reasons set forth above in the traversal of the rejection of claim 1, Applicants respectfully submit that the applied art fails to disclose at least one feature of claim 2. As such, a *prima facie* case of obviousness has not been established and claim 2 is patentable over the applied art.

d. Claim 4

Claim 4 recites:

A fast scanning stage for a scanning probe microscope, said scanning probe

microscope including a probe, said fast scanning stage comprising a fixed support and a sample stage having at least one axis of translation, said ***sample stage being affixed to said fixed support by actuator elements extending between said fixed support and said sample stage****, a sine waveform generator for actuating said actuator elements, in which said sample stage is displaced by said actuator elements being driven at the frequency of resonant vibration through the application of a bias voltage of 100 volts or less corresponding to translation of said sample stage with respect to said probe, wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz.*

In rejecting claim 4, the Office Action relies on the vibrating stage 37 of *Funakubo, et al.* for the alleged disclosure of the sample stage and the fastening sections 19 and 39 for the alleged disclosure of the means for causing displacement of the sample stage. Furthermore, the Office Action relies on piezoelectric actuators 18, 38 for the alleged disclosure of the actuator elements extending between the fixed support and the sample stage. Accordingly, and for at least the same reasons set forth above in the traversal of the rejection of claim 1, Applicants respectfully submit that the applied art fails to disclose at least one feature of claim 4. As such, a *prima facie* case of obviousness has not been established and claim 4 is patentable over the applied art.

<u>e. Claim 13</u>

Claim 13 recites:

A method of operating a fast scanning stage for a scanning probe microscope, said scanning probe microscope including a probe, said method comprising, ***providing a sample stage having a sample thereon and causing displacement of said sample on said sample stage relative to said probe by actuating actuator elements extending between said sample stage and a fixed support****, wherein said actuator elements drive said sample stage at the resonant frequency of said sample stage using a sine waveform generator through the application of a bias voltage of 100 volts or less, wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage*

resonance frequency between about 500 Hz to about 5 kHz.

In rejecting claim 13, the Office Action relies on the vibrating stage 37 of *Funakubo, et al.* for the alleged disclosure of the sample stage and the fastening sections 19 and 39 for the alleged disclosure of the means for causing displacement of the sample stage. Furthermore, the Office Action relies on piezoelectric actuators 18, 38 for the alleged disclosure of the actuator elements extending between the fixed support and the sample stage. Accordingly, and for at least the same reasons set forth above in the traversal of the rejection of claim 1, Applicants respectfully submit that the applied art fails to disclose at least one feature of claim13. As such, a *prima facie* case of obviousness has not been established and claim 13 is patentable over the applied art.

II. Rejection of claims 3, 5 and 6

Claims 3, 5 and 6 depend from claims 2, 4 and 5, respectively. For at least the reasons set forth above, Applicants respectfully submit that claims 2 and 4 are patentable over the applied art. Therefore, claims 3, 5 and 6 are patentable for at least the same reasons and in view of their additionally recited subject matter.

III. Rejection of claim 7

Claim 7 depends ultimately from 2. For at least the reasons set forth above, Applicants respectfully submit that claim 2 is patentable over the applied art. Therefore, claim 7 is patentable for at least the same reasons and in view of its additionally recited subject matter.

IV. Rejection of claim 8

Claim 8 depends from 2. For at least the reasons set forth above, Applicants respectfully submit that claim 2 is patentable over the applied art. Therefore, claim 8 is patentable for at least the same reasons and in view of its additionally recited subject matter.

V. Rejection of claims 9 and 10

Claims 9 and 10 depend immediately or ultimately from claim 2. For at least the reasons set forth above, Applicants respectfully submit that claim 2 is patentable over the applied art. Therefore, claims 9 and 10 are patentable for at least the same reasons and in view of its additionally recited subject matter.

VI. Rejection of claim 11

Claim 11 depends from claim 1. For at least the reasons set forth above, Applicants respectfully submit that claim 1 is patentable over the applied art. Therefore, claim 11 is patentable for at least the same reasons and in view of its additionally recited subject matter.

VII. Rejection of claim 15

Claim 15 depends from claim 13. For at least the reasons set forth above, Applicants respectfully submit that claim 13 is patentable over the applied art. Therefore, claim 15 is patentable for at least the same reasons and in view of its additionally recited subject matter.

Conclusion

In view the foregoing, applicant(s) respectfully request(s) that the Examiner withdraw the objection(s) and/or rejection(s) of record, allow all the pending claims, and find the application in condition for allowance.

If any points remain in issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully submitted on behalf of:

Agilent Technologies, Inc.

by: William S. Francos (Reg. No. 38,456)

Date: June 29, 2009

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APPENDIX

Claims on Appeal

1. A fast scanning stage for a scanning probe microscope, said scanning probe microscope including a probe, said fast scanning stage comprising, a fixed support, and a sample stage having at least one axis of translation, said sample stage being affixed to said fixed support by means for causing displacement of said sample stage relative to said probe, wherein said means for causing displacement comprises actuator elements extending between said fixed support and said sample stage and wherein said means for causing displacement is responsive to the application of a bias voltage of 100 volts or less and wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about kHz.

2. A fast scanning stage for a scanning probe microscope, said scanning probe microscope including a probe, said fast scanning stage comprising a fixed support and a sample stage having at least one axis of translation, said sample stage being affixed to said fixed support by means for causing displacement of said sample stage relative to said probe, and in which said means for causing displacement of said sample comprises actuator elements extending between said fixed support and said sample stage and a sine waveform generator for actuating said actuator elements through the application of a bias voltage of 100 volts or less, wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz.

3. A fast scanning stage as claimed in claim 2 in which said means for causing displacement of said sample stage comprise four actuator elements supporting said sample stage.

4. A fast scanning stage for a scanning probe microscope, said scanning probe microscope including a probe, said fast scanning stage comprising a fixed support and a sample stage having at least one axis of translation, said sample stage being affixed to said fixed support by actuator elements extending between said fixed support and said

sample stage, a sine waveform generator for actuating said actuator elements, in which said sample stage is displaced by said actuator elements being driven at the frequency of resonant vibration through the application of a bias voltage of 100 volts or less corresponding to translation of said sample stage with respect to said probe, wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about ~~250~~ 500 Hz to about 5 kHz.

5. A fast scanning stage as claimed in claim 4 in which said sample stage has a square or rectangular configuration and each corner of said sample stage is supported by one of said actuator elements.

6. A fast scanning stage as claimed in claim 5 in which said actuator elements form a parallelogram scanning element.

7. A fast scanning stage as claimed in claim 6 in which said actuator elements are connected electrically in parallel.

8. A fast scanning stage as claimed in claim 2 in which at least one of said actuator elements comprises a stack bending element.

9. A fast-axis scanning stage as claimed in claim 2 in which at least one of said actuator elements comprises a PZT bimorph.

10. A fast-axis scanning stage as claimed in claim 3 in which at least one of said actuator elements comprises a PZT bimorph.

11. A fast-axis scanning stage as claimed in claim 1 in which said sample stage is comprised of a material selected from the group consisting of ceramics, heat resistant polymers, and anodized aluminum.

12. A scanning probe microscope including a probe and a fast scanning stage, said fast scanning stage comprising a fixed support, and a sample stage having at least one axis of translation, said sample stage being affixed to said fixed support by actuator elements extending between said fixed support and said sample stage and supporting said sample stage to cause displacement of said sample stage relative to said probe through the application of a bias voltage of 100 volts or less, wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz.

13. A method of operating a fast scanning stage for a scanning probe microscope, said scanning probe microscope including a probe, said method comprising, providing a sample stage having a sample thereon and causing displacement of said sample on said sample stage relative to said probe by actuating actuator elements extending between said sample stage and a fixed support, wherein said actuator elements drive said sample stage at the resonant frequency of said sample stage using a sine waveform generator through the application of a bias voltage of 100 volts or less, wherein said scanning probe microscope is a fast atomic force microscope (AFM) with a scanning stage resonance frequency between about 500 Hz to about 5 kHz.

15. A method as claimed in claim 13 in which the resonant frequency of said sample stage is about $1/100^{th}$ that of the resonant frequency of said probe.

APPENDIX

Evidence

APPENDIX

Related Proceedings